# Innovation in the service supply chain: Qualitative research in a port context

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*The topic of collaborative innovation assumes a central importance in the world of port logistics, characterized by the presence of an interdependent network of actors with different skills who exchange resources, share knowledge and develop supply chain capabilities in the process of satisfying customers. In light of these considerations, this contribution aims to understand whether collaborative approaches are able to introduce disruptive forms of innovation based on the affirmation of new approaches to business and centred on the concept of value innovation and on the increasing integration between different actors (public and private) operating in the port system.*

*To this end, three different applications of the service supply chain framework were considered in an exploratory qualitative survey focused on the Port of Trieste, the most important port in Italy in both overall volume and rail traffic.*

**Keywords:** service supply chain, innovation, engagement ecosystem, port system, Port of Trieste

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## 1. Introduction and Objectives

The topic of collaborative innovation, oriented to the definition of new approaches to business, assumes a critical importance in a context such as that of logistic-port services, which for many years has not seen strong technological discontinuities.

Containerisation is a process that started more than fifty years ago and is reaching maturity today (Bologna, 2017). Both the rate of improvement in performance and the rate of diffusion in the market are tending to approach their natural limits or saturation points (Schilling & Izzo, 2017, p. 101–107), following the classic "S-curve" that characterizes the life cycle of a technology (Brown, 1992). Situations of this type trigger a ruthless competition between operators based on price leverage, with the objective of maintaining unchanged market share, while paths based on "incremental" or "routine" innovation prevail (with the adaptation of port infrastructure to container ships of increasing size), as these rely on existing business models and already-acquired technological skills. However, innovation cannot be reduced to the technological-productive components only, as it also involves the administrative-management dimension of the company (Notteboom & Vitellaro, 2019). In a broader meaning, the concept of innovation is indeed becoming more and more distributed, collaborative and systemic, as it involves a plurality of actors, according to a co-creative logic (de Luca, 2015; Varaldo, 2014).

The objective of this work is to try to understand if - even in the absence of strong technological breakthroughs (Pisano, 2015) - collaborative approaches are able to introduce disruptive forms of innovation in the current scenario of port logistics based on the affirmation of new approaches to business and focused on the concept of *value innovation*, inspired by a *blue ocean strategy* (Kim & Mauborgne, 2005). This strategy is based on the idea that market boundaries can be continually redefined by players: the objective is not to "beat" an increasingly fierce competition (*red ocean strategy*), but rather to "win without competing", creating an uncontested market space in which to conquer a latent, and as yet unexpressed, demand. In light of this perspective, *the entire system of activities must be aligned* with the dual objective of offering high added value services, while containing costs at the same time.

From this point of view, the Port of Trieste offers a particularly interesting field of investigation, not only for its strategic location in the logistics flows between Central Europe and the East but also for the organizational innovations introduced by the Eastern Adriatic Sea Port System Authority (AdSP MAO) that – in order to generating value innovation - aimed to reduce the fragmentation of the port cycle. The results are qualified as best practices in Italy at a managerial level (ISFORT, 2019).

## 2. Research Questions

Innovation can be recognized in any basic or complex logistic service that is new and useful for a particular audience (Flint *et al.*, 2005), regardless of whether it comes from investments in hard, technological components or from a redefinition of organizational and management models. Within this framework, the following research questions are posed in this work:

- **What does it mean to innovate from the managerial point of view in the logistic-port field?** Studies and reflections on the organization of port logistics have so far focused mainly on the legal (Brooks, 2004) and social (Turnbull & Wass, 2007) implications of the changes that have affected the sector in recent years. Without denying the topicality of these issues, it seems appropriate to focus attention on managerial aspects, aware that the performance of the actors involved in these activities "strongly affect the supply profile of ports and terminals, both in terms of efficiency and quality of services" (Notteboom & Vitellaro, 2019, p. 2).
- **How can forms of collaborative innovation in the logistic-port sector be realized?** The system of relationships that develops within a supply network can be considered a potential

primary locus for the generation of innovation. Physical proximity and interaction can in fact push actors to exchange knowledge, develop a shared language and develop a relationship of trust, allowing greater productivity in innovation processes (Schilling & Izzo, 2017) and, on paper, lay the foundations for the creation of an engagement ecosystem (Breidbach *et al.*, 2014; Brodie *et al.*, 2016) able to create shared value and embrace the aims of business and those of the community (Porter & Kramer, 2007).

- **What are the strategic challenges facing the logistic-port system? Which business opportunities open up for the companies gravitating to this system?** The most recent managerial guidelines suggest the opportunity to adopt a new perspective, oriented no longer to eroding market share at the expense of competitors but to generating innovations of value to fuel profitable and lasting growth (Kim & Mauborgne, 2005). In this framework, new opportunities could open up for companies interested in investing in the sector.

The Port of Trieste was chosen as the area of study. It is a landlord port characterized by a mixed public–private orientation. According to Italian Law 84/1994, the Port Authority acts as the regulator and owner of the infrastructure, while port operations are entrusted to private companies operating in competition.

## 3. Conceptual Framework

Port logistics involve an interdependent network of actors with different skills, such as terminal operators, shipping companies, freight forwarders, technical service providers and port authorities, who exchange resources, share knowledge and develop supply chain capabilities in the process of satisfying customers (De Martino & Morvillo, 2007). The inter-organizational relationships that develop in this area can be understood as facilitating factors (Chapman *et al.*, 2003) capable of creating a breeding ground for the activation of collaborative innovation (Hargadon & Sutton, 1997).

In order to understand the characteristics of port logistics networks and the contribution they can make to the development of collaborative innovation, it is appropriate to focus attention on the service supply chain, a concept derived from the manufacturing industry and uncritically extended to different sectors without accounting for the specific characteristics – intangibility, simultaneity between supply and use, non-standardizability, perishability – that inform the service industry (Lovelock, 1981; Parasuraman *et al.*, 1985). Based on these premises, Baltacioglu *et al.* (2007) developed a service supply chain framework divided into three basic units: the customer, the company providing the core service and the supplier of support services. Applying these premises to the port-logistics sector, some authors (De Martino *et al.*, 2013; De Martino, 2015) suggest three possible declinations of the framework (cfr. Table 1):

- Model A: The port carries out only activities related to transhipment.
- Model B: The port operates as a strategic node within an intermodal chain.
- Model C: The port becomes a logistics platform.

In model A, the port offers simple transhipment services: The goods are unloaded from a container ship and reloaded on a feeder vessel, which connects the hub with the final destination. The supply chain describes in a linear way the inter-organizational relationships between the three actors involved: the shipping company, terminal operator and technical-nautical service provider. Innovation aimed at improving efficiency focuses on technology and is developed within the company boundaries. Using forms of hierarchical governance, the Port Authority can encourage public-private partnerships to increase the efficiency of the port cycle.

**Table 1 - Key actors, physical resources and competencies involved in the port service supply chain**
Source: authors' elaboration based on De Martino *et al.* (2013); De Martino (2015)

| Key Actors | Physical resources | Competencies | Model | | |
|---|---|---|---|---|---|
| | | | A | B | C |
| **Port Authority** | Infrastructures, such as terminal, quay | Hierarchical governance | X | | |
| | | Encouraging public-private partnerships | X | X | X |
| | Modal connections | Collaborative governance | | X | |
| | | Networking activity | | X | X |
| | | Technology development | | X | X |
| | | Training | | X | X |
| | | ICT systems | | X | X |
| | Logistics areas | Integrative governance | | | X |
| | Dry ports | Collaboration with local stakeholders | | | X |
| | Manufacturing areas | Innovation network leadership | | | X |
| | | Knowledge brokering | | | X |
| | | Marketing and communication | | | X |
| **Shipping companies** | Assets for the supply of maritime transport | Maritime services | X | X | X |
| | | Sharing information | X | X | X |
| | | Inter-organizational trust | | X | X |
| | | Joint problem solving | | X | X |
| | | ICT systems | | X | X |
| | | Acquiring knowledge | | X | X |
| | | Highly skilled workforce | | | X |
| | | Generating innovation | | | X |
| **Terminal Operating Companies** | Assets for the supply of cargo handling | Cargo handling | X | X | X |
| | | Sharing information | X | X | X |
| | | Warehousing | | X | X |
| | | Inter-organizational trust | | X | X |
| | | Joint problem solving | | X | X |
| | | ICT systems | | X | X |
| | | Acquiring knowledge | | X | X |
| | | Highly skilled workforce | | | X |
| | | Generating innovation | | | X |
| **Port suppliers** | Assets for the supply of support services | Towage | X | X | X |
| | | Mooring | X | X | X |
| | | Pilotage | X | X | X |
| **Railway and road operators** | Assets for the supply of inland transport services | Inland transport | | X | X |
| | | Warehousing | | X | X |
| | | Sharing information | | X | X |
| | | Inter-organizational trust | | X | X |
| | | Joint problem solving | | X | X |
| | | ICT systems | | X | X |
| | | Acquiring knowledge | | X | X |
| | | Highly skilled workforce | | | X |
| | | Generating innovation | | | X |
| **Logistics operators** | Assets for the supply of value added logistics services | Value added logistics | | | X |
| | | Distribution | | | X |
| | | Sharing information | | | X |
| | | Inter-organizational trust | | | X |
| | | Joint problem solving | | | X |
| | | ICT systems | | | X |
| | | Acquiring knowledge | | | X |
| | | Highly skilled workforce | | | X |
| | | Generating innovation | | | X |
| **Manufacturers** | Assets for the supply of manufacturing activities | Manufacturing | | | X |
| | | Sharing information | | | X |
| | | Inter-organizational trust | | | X |
| | | Joint problem solving | | | X |
| | | ICT systems | | | X |
| | | Acquiring knowledge | | | X |
| | | Highly skilled workforce | | | X |
| | | Generating innovation | | | X |

Model B focuses on the logistics chains that connect the port to the demand basins located in the hinterland. The loading and unloading service at the quay is therefore complemented by the supply of intermodal connections, so inter-organizational relations become more complex. The port interacts not only with shippers and shipping companies but also with terminal operators, technical service providers and road and rail operators. Innovations affect the entire logistics chain and are linked not so much to the introduction of new technologies as to the activation of inter-organizational cooperation. The Port Authority assumes the role of community manager, strengthening the link between the port and the city that hosts it. It uses forms of collaborative governance based on public-private partnerships, intervenes directly in the management of railway infrastructure and seeks agreements with the actors in charge of transport and logistics governance.

In model C, the port extends its influence beyond traditional boundaries, acting as a logistics platform for manufacturing companies operating in the hinterland and offering value-added services for goods in transit (labelling, order preparation, stock management, etc.). The relational network is much more complex; the process of innovation, in this case, is generated by external resources. For this reason, the collaboration networks become essential for innovation. The Port Authority assumes the strategic role of innovation network leader, acting as an integrator of the port community system and not as a simple facilitator of initiatives promoted by individual groups of actors.

In this articulated conceptual model (De Martino *et al.*, 2013; De Martino, 2015), the analysis outlines the possibilities of collaborative innovation in the logistic-port environment, analysing the "regulatory mechanisms" that govern the various service supply chains. The present study aims to contribute to the theoretical framework by integrating the analysis of the relationships among the involved actors in terms of content, quality and personal experiences.

## 4. Method

Considering the complexity and dynamic character of the investigated phenomena, it was considered appropriate to opt for qualitative exploratory research. A first phase of desk analysis, dedicated to the review of the literature on these issues, was followed by the collection of data in the field. Qualitative research was carried out based on the analysis of both secondary data (official statistics of the AdSP MAO, documents available online and offline) and primary data, collected in different ways: "naturalistic" observation of the activities carried out by the actors during inspections carried out at the port and back port facilities, active participation in seminars and conferences dedicated to the evolution of the Port of Trieste and in-depth interviews (n=15) with qualified witnesses, specifically Port Authority officials, journalists, scholars and consultants interested in these issues and owners of companies operating in the port area. The size of the observation set was defined using the criterion of "theoretical saturation" (Cardano, 2003; Glaser & Strauss, 1967): the collection of materials continued until the contribution of further materials was null or extremely modest with respect to the objective of the survey.

For the face-to-face interviews a track was preliminarily defined to guide a talk of about 30-40 minutes and focused - with reference to the situation of the port of Trieste - on three main topics: a) definition of collaborative innovation within the service supply chain (key actors and variables, collaborative networks, etc.), b) operational methods with which collaborative innovation is pursued and c) business opportunities and challenges of a strategic nature. With respect to these issues, we also tried to bring out the personal experiences of the interviewees.

The interviews, audio-recorded with digital devices, were faithfully transcribed and subsequently examined using the thematic analysis method (Boyatzis, 1998; Braun & Clarke, 2006; Langdridge, 2004). This approach requires that the researcher never lose sight of the

meaning of the conversation as a whole (Breidbach *et al.*, 2014; Thomsen *et al.*, 1998), encoding significant portions of text capable of expressing an articulated concept (Braun & Clarke, 2006).

## 5. Findings

With regard to the first research question, all respondents recognized the important role that collaborative networks can play in achieving successful innovations, attributing to the Port Authority the function of knowledge broker, or coordinator in activating dynamics of this type. There is no lack of examples of bottom-up initiatives promoted by the operators of the port system, but more significant are the cases of multi-functional companies able to bring the skills acquired in other areas to the traditionally "closed" world of the port. There are also some critical issues: the latent conflict between tacit knowledge developed by dock workers and codified knowledge (Nonaka, 2007) imposed by the increasingly stringent protocols applied to logistic-port activities and the complexity of the port system, which includes actors with different characteristics and prerogatives (legal regime, size, culture, etc.), not always having a shared "language" and a common feeling.

With regard to the second question, the AdSP MAO seeks to encourage collaboration between all the actors of the port-logistics system and to strengthen the link between the port and the city that hosts it. Moreover, acting as the innovation network leader, it has activated specific tools, such as the Port Community System, a digital platform that allows the exchange and validation of information between operators, in order to improve the integration between different components of the service. The implementation of this tool, however, proceeds in a non-homogeneous manner, highlighting the difficulty in developing those relationships of trust necessary for the development of collaborative innovation.

Finally, with regard to the third question, AdSP MAO has tried to redefine and expand the boundaries of the business, identifying a set of innovative factors not adequately present and satisfied in the "competing" ports of Venice, Capodistria/Koper, Fiume/Rijeka and Ravenna. In practice, it was inspired by a "blue ocean" approach (Kim & Mauborgne, 2005), as explicitly stated by the President of AdSP MAO (d'Agostino, 2018). In fact, the strategic guidelines of the Port of Trieste focus on enhancing the intermodal vocation of the port of call, promoting the integration of quayside operations and rail services with the Central-Eastern European markets. The "regionalization" of the system has also been initiated through the participation - direct or indirect - of various logistic platforms scattered in the hinterland. At the same time, the Port Authority has been among the protagonists of the diplomatic exchange between the Italian and Chinese governments regarding the Belt & Road Initiative, a project that aims to re-actualize the system of relations with the Far East. With the aim of reducing fragmentation in the port-logistics cycle, the AdSP MAO has finally promoted the establishment of the ALPT-Port Labor Agency, ensuring the presence of a pool of manpower able to manage the traffic peaks affecting the port. All in all, these lines of development open business opportunities for those interested in operating in knowledge-intensive sectors linked to codified forms of knowledge but at the same time reduce the space for traditional labour-intensive activities anchored to tacit and contextual knowledge.

## 6. Discussion

Empirical research confirms the link between collaborative approaches and disruptive forms of innovation based on the affirmation of new approaches to business. However, this conceptual node needs to be examined in the light of the three service supply chain models illustrated above.

The Port of Trieste is a classic example of a gateway. It is not a transhipment port (Model A) but a port of destination located at the southern edge of a large region affected by the

transport network that branches off from it. The integration of quayside operations and rail transport allows the Port of Trieste to develop the role of strategic node within the intermodal chain that connects the Levant with the industrial sites of Central Europe (Model B). However, the strategic development lines (AdSP MAO, 2017) and the "regionalization" process configure the transition to the concept of a logistics platform (Model C). In this path, the AdSP MAO aspires to present itself as innovation network leader and to assume the role of knowledge broker (Hargadon & Sutton, 1997), able to encourage the sharing of information between actors and the birth of technological spill-overs (Jaffe, 1986), situations in which the benefits of the innovative activity of a company are transferred to different companies, institutions and clusters. All this, however, presupposes the creation of a fabric of trust and a considerable commitment to inter-organizational communication.

## 7. Conclusion

The relevance of the soft managerial variables is confirmed: In particular, in the context of the survey, the Port Authority assumes a central, propulsive role, promoting a new vision of business inspired by a "blue ocean" logic and the concept of value innovation.

However, it is not clear whether the Port Authority operates as a catalyst of collaborative drives disseminated in the port community or as the creator of a rational design aimed at connecting a plurality of actors that appear to be moved by different and sometimes conflicting interests. In fact, there is no lack of critical issues: on the one hand, the governance of the system oversees the processes of generating and sharing explicit knowledge, working in the direction of a growing rationalization of processes; on the other hand, some components of the system claim the role of tacit and contextual knowledge, bound to the boundaries of the port and difficult to replicate elsewhere (Nonaka, 2007). This tension, albeit latent, represents a critical issue to be addressed for the development of the trust fabric that the logic of collaborative innovation needs to establish itself in the long term (von Hippel, 1987; Szulanski, 1996; Grandinetti, 1998; Schilling & Izzo, 2017).

In any case, we are not in the presence of an engagement ecosystem, a context in which each actor no longer proposes himself as the centre of a series of dyadic relationships but rather as one of the many partners that interact within a social and economic nexus (see Hillebrand *et al.*, 2015; Laczniak & Murphy, 2012; Werhane, 2012).

## 8. Limitations, Further Research and Managerial Implications

The results cannot be generalized due to the methodological approach used in this study: they allow, however, to build an interesting interpretative picture of the studied phenomenon.

For further research, it would be appropriate to replicate this type of study in other port contexts in order to highlight elements of harmony and dissonance with what emerged from this study.

Collaborative innovation presupposes a relational framework capable of generating resources of trust between different actors. Given the complexity of the logistic-port system, it is therefore appropriate to invest energies in the "relational" integration between the various components of the process, not only implementing IT tools for sharing information but also promoting discussion tables and listening occasions for active interaction with the various parties involved.

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